

REMARKS

Claim 22 was rejected under 35 U.S.C. §112, second paragraph as being indefinite. Claims 1-2, 4-5, 11-12, 14-16, 21, 27-28, and 30-35 were rejected under 35 U.S.C. §102(b) as being anticipated by Kuribayashi. Claims 1-5, 11-13, 16-18, 21, 23, 27-28, and 30-35 were rejected under 102(e) as being anticipated by Peterson. Claims 3, 10, 17-20, 22, 26, and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kuribayashi. Claims 10, 19-20, 22, and 24-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Peterson. Claims 6-9 and 36 were rejected under 35 U.S.C. §103(a) as being unpatentable over either Kuribayashi or Peterson in view of Kato. Reconsideration of all rejections in view of the foregoing amendments and following remarks is respectfully requested.

Claim 22 was rejected as being indefinite due to the language “not necessarily” in the claim. Claim 22 has been amended to clarify the present invention. The amendment removes the indefinite language. Accordingly, claim 22 is in condition for allowance and the rejection under 35 U.S.C. §112, second paragraph should be withdrawn.

All of the claims were rejected as anticipated or obvious in view of either Kuribayashi for Peterson. However, neither Kuribayashi nor Peterson disclose the features of the invention as recited in the claims. Therefore, the claims patentably distinguish over the cited art and should be allowed.

The present invention, as recited in independent claims 1 and 32, include two thermally conductive pads on a top surface of a laser diode. The laser diode has a top electrode and a bottom electrode, with the bottom electrode being electrically coupled to the carrier. The thermally conductive pads on the top surface of the laser diode are used to connect bonding wires

for dissipation of heat. The bonding wires may also be used for an electrical connection to the top electrode of the laser diode, as recited in claims.

The use of two pads for connection bonding wires for heat dissipation is not shown in the prior art. As is noted in the specification, prior art laser diodes included a single conductive pad for attaching one or more bonding wires. None of the prior art teaches or suggests such a structure. In fact, the Office Action assumes the presence of this significant element of the claims within the cited art.

Kuribayashi discloses a module having a peltier element. The Office Action relies upon Fig. 5 as illustrating the claims of the present invention. As understood, Fig. 5 illustrates a laser diode 18 with two terminals on the top. The two terminals are connected to pads 20, 22 on the carrier by bonding wires 24, 28. The Office Action suggests that conductive pads on the terminals of the laser diode would be inherent in the disclosure for attaching the bonding wires. Thus, Kuribayashi does not disclose conductive pads. The Office Action merely assumes that they would be there. Furthermore, nothing in Kuribayashi suggests the presence on the laser diode of thermally conductive pads. The bonding wires 24, 28 are for making electrical connections. The reference does not disclose, teach or suggest the presence of any wires or pads for thermal connections. Finally, claim 1 recites that the bottom of the laser diode is electrically coupled to the carrier and that the top of the laser diode includes two thermally conductive pads. Kuribayashi does not teach or suggest an electrical connection on a side opposite the thermal connection. Thus, even if thermally conductive pads were inherently present in Kuribayashi for attaching the bonding wires 24, 28, Kuribayashi would not disclose the present claimed invention.

The second reference, Peterson, discloses a microlaser submount assembly including a heat sink. The top side of the laser diode 12 is attached to the carrier with bonding wires (not numbered). The Office Action notes that the reference does not explicitly disclose conductive pads on the laser, but considers them to be inherent because they are necessary for attaching bonding wires. However, as with Kuribayashi, the bonding wires disclosed in Peterson are for electrical connections. There is nothing in Peterson which teaches or suggest the presence of thermally conductive pads. Furthermore, as noted in the specification, prior art devices, such as that disclosed in Peterson, included a single conductive pad on the top of the laser diode for attaching all of the bonding wires. There is nothing in Peterson which teaches or suggests the presence of two or more thermally conductive pads for attaching different bonding wires. Thus, Peterson fails to teach or suggest the present claimed invention as set forth in claim 1.

The Office Action further relies upon Kato as teaching certain aspects of some dependent claims. Kato does not overcome the deficiencies of Kuribayash or Peterson. Fig. 2 of Kato illustrates two bonding wires 12a, 12b. However, these bonding wires are both connected to a single contact electrode 12. Thus, there is nothing in Kato which teaches or suggests two thermally conductive pads with separate bonding wires connected to each pad as set forth in claim 1.

Since none of the prior art teaches or suggests the limitations of claim 1, this claim is in condition for allowance. Claims 2, 3, and 5-30 depend from claim 1 and are allowable for at least the same reasons. Claim 32 is an independent claim reciting a laser diode assembly. As with claim 1, claim 32 recites two thermally conductive pads and two bonding members, one attached to each of the two pads. For the reasons discussed above with respect to claim 1, claim 32 patentably distinguishes over the cited art and is in condition for allowance.

Independent claim 33 also recites a laser diode assembly and includes means for transferring heat generated at the diode to the thermally conductive layer of the carrier. The cited art does not disclose a thermally conductive layer on the carrier or means for transferring heat from the diode to the thermally conductive layer. Therefore, claim 33 is also in condition for allowance. Claims 34-36 depend from claim 33 and are allowable for at least the same reasons.

Based on the foregoing, this application is believed to be in allowable condition, and a notice to that effect is respectfully requested. If the Examiner has any questions, he is invited to contact the Applicant's undersigned attorney at the number provided below.

Respectfully submitted,



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